

SPECIFICATION

TITLE OF THE INVENTION: NOZZLE HOOK OF FUELING
APPARATUS

TECHNICAL FIELD

[0001.] The present invention relates to a nozzle hook of fueling apparatus installed in a gas station or the like, to the nozzle hook is hooked (hanged) a fueling nozzle provided at the tip of a fueling hose, and when fueling a vehicle, the engagement with the fueling nozzle is released (the fueling nozzle is unhooked).

BACKGROUND ART

[0002.] In a fueling apparatus installed in a gas station or the like, a fueling nozzle provided at the tip of a fueling hose is unhooked from a nozzle hook, and the fueling nozzle is inserted into a fueling port of a vehicle to fuel a fuel tank of the vehicle. In the fueling apparatus, a nozzle hook for the fueling nozzle is provided with a nozzle switch that detects that the fueling nozzle is hooked or unhooked (hanged or unhanged), and a control unit of the fueling apparatus starts or stops a fueling pump based on ON/OFF of the nozzle switch. As a nozzle hook according to a prior art, it has been proposed that the nozzle switch is provided on a housing side of the fueling apparatus and the movement of a switch operating lever moving in conjunction with the hook/unhook of the fueling nozzle is transmitted to the nozzle switch via a link mechanism (refer to Patent document 1).

[0003.] However, in the prior art described in the document, the operation of the switch operating lever provided on the nozzle hook is transmitted to the nozzle switch via the link mechanism, so that it is required to determine its mounting position with high accuracy when the nozzle hook is mounted. This is because if the mounting position of the nozzle hook is not accurate, the nozzle switch may not be turned on and off normally, which may interfere with fueling work with the fueling apparatus. Further, repeatedly opening and closing the panel of the fueling apparatus cause the relative position between a sensing part of the nozzle switch and a member in contact with the nozzle switch to change. On the other hand, in order to prevent the relative position between the sensing part of the nozzle switch and the member in contact with the nozzle switch from changing, if the nozzle hook and the nozzle switch are integrated, it is required to remove and reassemble the link mechanism, cables, and so on during maintenance, which deteriorates maintainability. Further, in the prior art, since the nozzle switch is arranged on a front side of a frame of a housing body, the nozzle switch has a structure in which the nozzle switch protrudes on the front side of the frame. Therefore, during maintenance work or the like, operators may come into contact with the protruding nozzle switch and be injured.

PRIOR ART DOCUMENT

PATENT DOCUMENT

[0004.] Patent Document 1: WO/2018/025455A1

OUTLINE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0005.] The present invention has been proposed in view of the above-mentioned problems of the prior art, and the object thereof is to provide a nozzle hook of fueling apparatus in which a nozzle switch always operates normally; fueling work in the fueling apparatus is always performed properly; complicated work such as removal and reassembly of parts is not required; and a nozzle switch is in a position where an operator is not injured.

MEANS OF SOLVING THE PROBLEMS

[0006.] A nozzle hook (1) of fueling apparatus according to the present invention includes: a nozzle hook body (2) for holding a discharge pipe (21) of a fueling nozzle (20); a receiving part (3) for holding a lever guard (22) of the fueling nozzle (20); a switch part (4) operated by the lever guard (22); a rotating member (5), when the fueling nozzle (20) is hooked (hanged) on the nozzle hook (1), the rotating member (5) is pressed by the lever guard (22) and a back surface of the switch part (4) comes into contact with the rotating member (5); a driving member (6) driven by the rotating member (5), the driving member (6) disposed at a position away from the nozzle hook body (2), and the driving member (6) driving a nozzle switch (10) attached to a housing body (101); and a connecting member (7) for connecting the rotating member (5) and the driving member (6). Here, the connecting member (7) is preferably a flexible liner material such as a wire.

[0007.] In the present invention, it is preferable that the rotating member (5) includes: a pressing part (5A) pressed by a convex part (4B) formed on the back surface of the switch part (4); a first rotating shaft (5B) rotating by receiving a force from the pressing part (5A); and a first connecting part (5C) for connecting an end (7C) of the connecting member (7) at a position separated from the first rotating shaft (5B). And, it is preferable that a surface of the convex part (4B) on the pressing part (5A) side is formed such that an arc that is a locus of the first connecting part (5C) is equally divided by a horizontal extension line (virtual radius k) of the first rotating shaft (5B) (In Figs. 1-4 and 6).

[0008.] In addition, in the present invention, it is preferable that the driving member (6) includes: a second rotating shaft (6D) with a spring for urging another end (7D) of the connecting member (7) in a pulling direction; a working piece (6C, leaf spring) provided at an end to operate the nozzle switch (10); and a second connecting part (6E) provided at another end to connect the connecting member (7). Here, it is preferable that the nozzle switch (10) is attached to an upper panel (102) of the housing body (101), and a horizontal projection position of the

working piece (6C) from an opposite side of the nozzle switch (10) on the upper panel (102) to which the nozzle switch (10) is attached when the fueling nozzle (20) is hooked on the nozzle hook (1) and that of the working piece (6C) when the fueling nozzle (20) is not hooked on the nozzle hook (1) are the same.

[0009.] Further, in the present invention, the driving member (6) is preferably provided with a notch (6F) that contacts with a stopper pin (9). In carrying out the present invention, the distance between the pressing portion (5A) and the first rotating shaft (5B) is preferably shortened to make the amount of movement of the first connecting portion (5C) connected to the connecting member (7) large. Further, it is possible to provide a spring in the rotating part (4A) of the switch part (4) to assist the return operation of the connecting member (7).

EFFECTS OF THE INVENTION

[0010.] In the present invention with the above construction, when the fueling nozzle (20) is hooked on the nozzle hook (1), the switch portion (4) is pressed by the lever guard (22) of the fueling nozzle (20) to rotate the rotating member (5), and the rotation of the rotating member (5) drives the driving member (6) via the connecting member (7) and the nozzle switch (10) is driven, so that the nozzle switch (10) can reliably be operated by hooking or unhooking the fueling nozzle (20).

[0011.] In the present invention, with the rotating member (5) including: a pressing part (5A) pressed by a convex part (4B) formed on the back surface of the switch part (4); a first rotating shaft (5B) rotating by receiving a force from the pressing part (5A); and a first connecting part (5C) for connecting an end (7C) of the connecting member (7) at a position separated from the first rotating shaft (5B), the amount of rotation of the rotating member (5) can be set according to the distance between the first rotating shaft (5B) and the first connecting portion (5C), and in addition, the amount of displacement of the connecting member (7) can be set. Here, an arc that is a locus of the first connecting part (5C) is equally divided by a horizontal extension line (virtual radius k) of the first rotating shaft (5B) (In Figs 1-4 and 6), which most efficiently converts the rotation of the convex portion (4B) on the pressing portion (5A) side into a tensile force of the wire (7A) of the connecting member (7).

[0012.] In the present invention, with the driving member (6) including: a second rotating shaft (6D) with a spring for urging another end (7D) of the connecting member (7) in a pulling direction; a working piece (6C) provided at an end to operate the nozzle switch (10); and a second connecting part (6E) provided at another end to connect the connecting member (7), the operation of the switch part (4) can be reliably transmitted to the nozzle switch (10). Here, the nozzle switch (10) is attached to the upper panel (102) of the housing body (101), and a

horizontal projection position of the leaf spring (6C) from an opposite side of the nozzle switch (10) on the upper panel (102) to which the nozzle switch (10) is attached when the fueling nozzle (20) is hooked on the nozzle hook (1) and that of the leaf spring (6C) when the fueling nozzle (20) is not hooked on the nozzle hook (1) are preferably the same. When the leaf spring (6C) is arranged such that a horizontal projection position of the leaf spring (6C) from an opposite side of the nozzle switch (10) on the upper panel (102) to which the nozzle switch (10) is attached when the fueling nozzle (20) is hooked on the nozzle hook (1) and that of the leaf spring (6C) when the fueling nozzle (20) is not hooked on the nozzle hook (1) are preferably the same, the condition that the leaf spring (6C) does not come into contact with the nozzle switch (10) (so-called “submerged” state) can be prevented.

[0013.] Further, in the present invention, with the driving member (6) with a notch (6F) that contacts with a stopper pin (9), an excessive force is prevented from being applied to the leaf spring (6C), and the nozzle switch (10) is prevented from being damaged.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014.] [Figure 1] An explanatory cross-sectional view showing a condition that a fueling nozzle is not hooked on a nozzle hook in an embodiment of the present invention.

[Figure 2] An explanatory cross-sectional view showing a condition that a fueling nozzle is hooked.

[Figure 3] A partially enlarged cross-sectional view showing the vicinity of a switch part in a state where a fueling nozzle is not hooked.

[Figure 4] A partially enlarged cross-sectional view showing the vicinity of a switch part in a state where a fueling nozzle is hooked.

[Figure 5] An explanatory view showing the relative relationship, when a fueling nozzle is hooked and a switch part is pressed, between a force pressing the switch part and a direction of rotating a rotating member.

[Figure 6] An explanatory view showing the relative relationship between a pressing part and a pulling force pulling a connecting member.

[Figure 7] A partially enlarged sectional view showing the vicinity of a nozzle switch in a state where a fueling nozzle is not hooked.

[Figure 8] A partially enlarged sectional view showing the vicinity of a nozzle switch in a state where a fueling nozzle is hooked.

[Figure 9] An explanatory view showing a condition that the nozzle switch does not work even though a fueling nozzle is hooked.

[Figure 10] An explanatory view showing the relative positional relationship, for preventing the condition that the nozzle switch does not work even though the fueling nozzle is hooked, between a leaf spring and a nozzle switch detecting part.

[Figure 11] An explanatory view showing the first modification example of the embodiment shown in the drawings.

[Figure 12] An explanatory view showing the second modification example of the embodiment shown in the drawings.

MODE FOR CARRYING OUT THE INVENTION

[0015.] Hereinafter, an embodiment of the present invention will be described with reference to the accompanying drawings. In the accompanying drawings, a fueling apparatus to which the present invention is applied is indicated with the reference numeral 100. In Figs. 1 and 2, the fueling apparatus indicated with the reference numeral 100 is provided with a nozzle hook 1, and a fueling nozzle 20 (see Fig. 2: not shown in Fig. 1) is hooked on and unhooked from the nozzle hook 1. The fueling nozzle 20 is provided at the tip of a fueling hose (not shown). When fueling a vehicle (not shown), the fueling nozzle 20 (Fig. 2) is unhooked from the nozzle hook 1, and the fueling nozzle 20 is inserted into a fueling port (not shown) of the vehicle to fuel the fuel tank of the vehicle. As described above, Fig. 1 shows a state in which the fueling nozzle 20 is not hooked on the nozzle hook 1, and Fig. 2 shows a state in which the fueling nozzle 20 is hooked on the nozzle hook 1. In Figs. 1 and 2, the nozzle hook 1 includes a hood part 2A of a nozzle hook body 2, a receiving part 3, a switch part 4, a rotating member 5, a driving member 6, and a connecting member 7 connecting the rotating member 5 and the driving member 6. A discharge pipe 21 of the fueling nozzle 20 (Fig. 2) is held in the hood part 2A of the nozzle hook body 2. The receiving part 3 holds a lever guard 22 of the fueling nozzle 20. When the fueling nozzle 20 is hooked (hanged) on the nozzle hook 1, the switch part 4 is pressed by the lever guard 22 in the direction of arrow A1 (Fig. 1) to operate. When the switch part 4 operates, the rotating member 5 comes into contact with the convex part 4B formed on the back surface of the switch part 4 (the surface opposite to the side pressed by the lever guard 22). The driving member 6, which is arranged at a position separated from the nozzle hook body 2, is driven by the rotating member 5, and drives a nozzle switch 10 attached to an upper panel 102 of a housing body 101.

[0016.] In Fig. 1, the switch part 4 is rotatably supported by a rotating shaft 4A, and the rotating shaft 4A is fixed to the nozzle hook body 2. Then, the switch part 4 protrudes from an opening 2A (Fig. 1) of the nozzle hook body 2 to the outside of the nozzle hook body 2 (opposite direction of the arrow A1: to the left in Fig. 1) due to a repulsive force of urging means (not shown). When the fueling nozzle 20 is hooked on the nozzle hook 1 as shown in Fig. 2, the switch part 4 is pressed by the lever guard 22 of the fueling nozzle 20 (arrow A1 in Fig. 1), and the switch part 4 rotates counterclockwise around the rotating shaft 4A and stops at a position within the nozzle hook body 2 (a state in which the

switch part 4 does not protrude outward from the body 2 from the opening 2A). A convex part 4B is formed on the back surface side of the switch part 4 (the side opposite to the side pressed by the lever guard 22 of the fueling nozzle 20).

[0017.] In Figs. 1 and 2, a rotating member 5 is arranged on the back surface side of the switch part 4, and the rotating member 5 is attached to the nozzle hook body 2 via a locking member 11. In Figs. 1 and 2, the rotating member 5 is configured to have a shape in which two rectangular plate-shaped members are connected in a substantially L-shape. The rotating member 5 includes a pressing part 5A, a first rotating shaft 5B, and a first connecting part 5C. The pressing part 5A is a member that contacts with and is pressed by the convex part 4B formed on the back surface side of the switch part 4. The first rotating shaft 5B is a rotation center in which the pressing part 5A rotates with respect to the locking member 11 (nozzle hook body 2) when pressed by the convex part 4B. The first connecting part 5C is provided at a position separated from the first rotating shaft 5B and is connected to an end 7C of the connecting member 7. Here, the pressing part 5A has a cylindrical shape. Therefore, the arc drawn by the convex part 4B of the switch part 4 and the arc drawn by the pressing part 5A are different, and the pressing start point and the pressing end point by the convex part 4B are different, and the adjustment as described later with reference to Fig. 6 becomes possible. Further, the nozzle hook body 2 is provided with a stopper 13 for limiting the rotation of the switch part 4 when the fueling nozzle 20 is hooked on the nozzle hook 1 and limiting the rotation of the rotating member 5.

[0018.] In Figs. 1 and 2, the connecting member 7 includes a wire 7A and a sheath 7B (cover member), and an end 7C of the connecting member 7 is connected to the first connecting part 5C of the rotating member 5, and the other end 7D of the connecting member 7 is connected to the second connecting part 6E of the driving member 6. The driving member 6 has a body part 6A which is a rectangular plate-shaped member, a working piece mounting part 6B, and a working piece 6C (leaf spring). The working piece mounting part 6B is connected to an end part of the body part 6A (the end part on the side separated from the connecting member 7). The working piece 6C (leaf spring) is fixed to the tip of the working piece mounting part 6B by a fixing means 6G, and operates the nozzle switch 10. The driving member 6 is rotatably supported by the second rotating shaft 6D in the body 6A with respect to the mounting bracket 12 (Fig. 1) fixed to the upper part of the nozzle hook body 2. The driving member 6 is connected to the other end 7D of the connecting member 7 at the second connecting part 6E. Although not explicitly shown, the second rotating shaft 6D includes a spring that

urges the other end 7D of the connecting member 7 in a pulling direction (to maintain the state of Fig. 1).

[0019.] A notch 6F (Fig. 1) is formed in the body 6A of the driving member 6, and in the states of Figs. 1 and 2, a stopper pin 9 is set so as to be located in the notch 6F. Here, the stopper pin 9 is fixed to the mounting bracket 12, and the stopper pin 9 is located in the notch 6F when the driving member 6 is mounted on the mounting bracket 12. When the notch 6F comes into contact with the stopper pin 9, it is prevented from applying an excessive force to the leaf spring 6C (working piece), and the nozzle switch 10 is prevented from being damaged. In Figs. 1 and 2, a stopper 14 is provided on the mounting bracket 12, and the stopper 14 is used to limit the rotation of the driving member 6 or the working piece mounting part 6B when the fueling nozzle 20 is unhooked from the nozzle hook 1.

[0020.] As shown in Fig. 2, when the fueling nozzle 20 is hooked on the nozzle hook 1, the rotating member 5 rotates about the first rotating shaft 5B (arrows A2 and A3: Fig. 1), and the wire 7A of the connecting member 7 is pulled through the first connecting part 5C (arrow A4: Fig. 1). When the wire 7A is pulled in the A4 direction, the driving member 6 rotates about the second rotating shaft 6D in the direction of the arrow A5 (Fig. 1). When the driving member 6 rotates in the direction of the arrow A5, the working piece mounting part 6B provided at an end of the driving member 6 (body part 6A) opposite to the second connecting part 6E rotates in the direction of the arrow A6 (Fig. 1), and the operating piece 6C (leaf spring) attached to an end of the operating piece mounting part 6B (the end of the driving member 6) comes into contact with a sensing part 10A of the nozzle switch 10 attached to the upper panel 102 as shown in FIG 2. When the working piece 6C (leaf spring) and the sensing unit 10A are not in contact with each other as shown in Fig. 1, the nozzle switch 10 generates a signal (ON signal) indicating that the fueling nozzle 20 is unhooked from the nozzle hook 1 to a control device (not shown) of the fueling apparatus 100. On the other hand, as shown in Fig. 2, in a state where the working piece 6C and the sensing unit 10A are in contact with each other, the nozzle switch 10 generates a signal (OFF signal) indicating that the fueling nozzle 20 is hooked on the nozzle hook 1 to a control device (not shown) of the fueling apparatus 100. Although not shown, an elastic body (spring) is provided in the rotating part 4A of the switch part 4, and the spring assists the operation (return operation) that the connecting member 7 becomes the state shown in Fig. 1 when the fueling nozzle 20 is not hooked on the nozzle hook 1.

[0021.] The structure in the vicinity of the switch part 4 will be described in more detail with reference to Figs. 3 and 4. When the fueling nozzle 20 is hooked on the nozzle hook 1 (see Fig. 2), in Fig. 3, the switch part 4 is pressed in the direction of the arrow A1, and the switch part 4 rotates

counterclockwise around the rotating part 4A. When the switch part 4 rotates counterclockwise, the convex part 4B of the switch part 4 presses the pressing part 5A of the rotating member 5, and the pressing part 5A of the rotating member 5 rotates about the first rotating shaft 5B as shown by the arrow A2. As described above, the pressing part 5A has a cylindrical shape, and is smoothly pressed while moving the contact point between the convex part 4B of the smooth arc-shaped switch part 4 and the pressing part 5A.

[0022.] In Fig. 3, when the pressing part 5A of the rotating member 5 rotates about the first rotating shaft 5B as indicated by the arrow A2, the part of the L-shaped rotating member 5 on the first connecting part 5C side rotates in the direction of the arrow A3. Since the end 7C of the wire 7A of the connecting member 7 is connected to the rotating member 5 with the first connecting part 5C, when the rotating member 5 rotates in the direction of the arrow A3, the wire 7A of the connecting member 7 is pulled in the direction of the arrow A4. A tensile force acting on the wire 7A of the connecting member 7 is transmitted to the nozzle switch 10 via a driving member 6 (not shown in Figs. 3 and 4), but the transmission to the nozzle switch 10 is described later with reference to Figs. 7 and 8. In order to detect the hook/unhook (hanging/unhanging) of the fueling nozzle 20 on/from the nozzle hook 1 with high accuracy by the nozzle switch 10 (Figs. 1, Fig. 2, Fig. 7, Fig. 8), it is desirable that the amount of pulling that the rotating member 5 pulls the wire 7A of the connecting member via the first connecting part 5C is large. For that purpose, it is desirable to make the distance between the pressing part 5A of the rotating member 5 and the first rotating shaft 5B shorter than the distance between the first rotating shaft 5B and the first connecting part 5C to increase the amount of movement of the first connecting part 5C when the fueling nozzle 20 is hooked on the nozzle hook 1.

[0023.] In addition to the above, in the illustrated embodiment, the relative position between the convex part 4B of the switch part 4 and the pressing part 5A of the rotating member 5 is set such that the force when the fueling nozzle 20 is hooked on the nozzle hook 1 and the switch part 4 is pushed (the force of the arrow A1 in Figs. 1 and 3) is surely transmitted as a rotation force (the force of the arrow A3 in Figs. 1 and 3) of the rotating member 5. With reference to Fig. 5 also, the relative position of the convex part 4B of the switch part 4 and the pressing part 5A of the rotating member 5 will be described. In Fig. 5, the reference numeral AR1 is an arc having a radius of curvature L5, which indicates the locus of the contact point with the convex part 4B of the switch part 4 in the pressing part 5A rotating around the first rotating shaft 5B of the rotating member 5 in Figs. 1 and 2. Further, the reference TL indicated by the alternate long and short dash line is a tangent line of

the arc AR1. It is most efficient that the force that the switch part 4 is pushed and acts on the pressing part 5A of the rotating member 5 from the convex part 4B is transmitted in the direction of the tangent line TL of the arc AR1 and acts on the pressing part 5A.

[0024.] However, it is difficult that all of the forces at which the switch part 4 of the nozzle hook 1 is pushed and the pressing part 5A of the rotating member 5 is pressed by the convex part 4B (arrows F, F1, F2 in Fig. 5: may be comprehensively indicated by reference numeral F) to act in the direction of the tangent TL of the arc AR1 (circle with radius L5). Therefore, in the illustrated embodiment, when the direction of the force when the convex part 4B of the switch part 4 starts pressing the pressing part 5A of the rotating member 5 is set as the arrow F1 and the direction of the force when the convex part 4B of the switch part 4 finishes pressing the pressing part 5A of the rotating member 5 is set as the arrow F2, the shape of the convex part 4B (the shape on the pressing part 5A side) is set such that the direction of the force F at which the convex part 4B of the switch part 4 of the nozzle hook 1 presses the pressing part 5A of the rotating member 5 becomes between the direction at the time when the pressing starts (the direction of the arrow F1) and the direction at the end of pressing (the direction of arrow F2). With this, the direction in which the force F for pressing the pressing part 5A by the convex part 4B acts is approximated to the direction of the tangent line TL of the arc AR1 (circle having a radius L5). Setting the shape of the convex part 4B (the shape on the pressing part 5A side) in this way, the force F that the convex part 4B presses on the pressing part 5A does not all act in the direction of the tangent line TL of the arc AR1, since it acts on a range or region in the vicinity of the tangent TL direction, the force when the switch part 4 of the nozzle hook 1 is pressed is effectively transmitted as the rotational force of the rotating member 5. In Fig. 5, in order to approximate the direction in which the force F that the convex part 4B presses the pressing part 5A acts to the direction of the tangential line TL, for example, the angle between the arrow F1 and the tangential line direction is preferably 6.5° to 8.5° , and the angle between the arrow F2 and the tangential direction is preferably 9° to 11° .

[0025.] Next, with reference to Fig. 6, in the illustrated embodiment, a configuration for efficiently transmitting the rotation of the rotating member 5 to the connecting member 7 via the first connecting part 5C will be described. In Fig. 6, the locus of the first connecting part 5C that rotates in the direction of the arrow AA about the first rotating shaft 5B is shown by the arc AR2. As is clear from a comparison between Figs. 3 and 4, it is most efficient that the rotation direction of the rotating member 5 at the first connecting part 5C is set to be the direction in which the wire 7A of the connecting member 7 extends (down

along the straight line L in Fig. 6). That is, it is most efficient to pull the wire 7A straight downward in Fig. 6 by the rotating member 5. However, since the locus of the first connecting part 5C of the rotating member 5 has an arc shape centered on the first rotating shaft 5B, the wire 7A cannot be pulled straight downward in Fig. 6. In order to efficiently pull the wire 7A by the rotating member 5, it is necessary to make the deviation in the arrow AB direction as small as possible.

[0026.] Therefore, in the illustrated embodiment, as shown in Fig. 6, the arc AR2 is arranged so as to be equally divided by the horizontal extension line (virtual radius k) of the first rotation axis 5B. Here, the arc AR2 is the locus of the first connecting part 5C from the initial stage (start of tension) when the wire 7A is pulled by the rotating member 5 to the end of pulling (until the end of tension). The intersection of the horizontal extension line of the first rotation axis 5B and the arc AR2 which is the locus of the first connecting part 5C is indicated by the reference numeral "B1", the position of the first connecting part 5C at the time of the start of tension is indicated by the reference numeral "B2", and the position of the first connecting part 5C at the time of the end of tension is indicated by the number "B3" in FIG 6. In other words, the central angle " ϕ " between the virtual radius "k" and the position B2 of the first connecting part 5C at the beginning of tension is set to be equal to the central angle " ϕ " between the virtual radius "k" and the position B3 at the end of tension. Further, the surface of the convex part 4A of the switch part 4 on the pressing part 5A side is formed such that the arc AR2 which is the locus of the first connecting part 5C is equally divided by the virtual radius "k".

[0027.] When set as described above, the deviation amount "H" in the arrow AB direction is minimized, and the rotation of the rotating member 5 is most efficiently converted into the tensile force of the wire 7A of the connecting member 7. The pulling direction in which the wire 7A of the connecting member 7 is pulled most efficiently by the first connecting part 5C of the rotating member 5 is the direction in which the wire 7A of the connecting member 7 extends (indicated by a straight line L in Fig. 6). If the deviation amount H is large, the efficiency of converting the rotation of the rotating member 5 into the tensile force of the wire 7A of the connecting member 7 deteriorates. On the other hand, when the deviation amount H is the minimum, the efficiency of converting the rotation of the rotating member 5 into the tensile force of the wire 7A of the connecting member 7 becomes optimum. Then, in order to efficiently convert the rotation of the rotating member 5 into the tensile force of the wire 7A of the connecting member 7, the central angle 2ϕ between the position of the first connecting part 5C at the beginning of tension (indicated by the reference numeral "B2") and the position at the end of tension (indicated by the symbol "B3") should be made as

small as possible, and the radius k (the virtual radius connecting the first rotating shaft 5B and the first connecting part 5C) should be made as large as possible.

[0028.] The structure in the vicinity of the nozzle switch 10 in the illustrated embodiment will be described in more detail mainly with reference to Figs. 7 and 8. In Fig. 7, since the second rotating shaft 6D is provided with a spring that urges the other end 7D of the connecting member 7 so as to pull the other end 7D in the direction opposite to the arrow A4, the elastic repulsive force of the spring causes the fueling nozzle 20 (Fig. 2) is maintained in a state of not being hooked on the nozzle hook 1 (states of Figs. 7 and 2). When the fueling nozzle 20 is hooked on the nozzle hook 1 as shown in Fig. 3, in Fig. 3, the wire 7A of the connecting member 7 is pulled in the direction of arrow A4 through the first connecting part 5C (Figs. 1 to 4) of the rotating member 5. When the wire 7A of the connecting member 7 is pulled in the direction of the arrow A4, in Fig. 7, the driving member 6 connected to the wire 7A of the connecting member 7 with the second connecting part 6E rotates in the arrow A5 direction centered on the second rotating shaft 6D.

[0029.] When the driving member 6 rotates in the direction of arrow A5 about the second rotating shaft 6D, the working piece mounting part 6B side of the driving member 6 rotates in the direction of arrow A6, and the working piece 6C (leaf spring) attached to the end part of the working piece mounting part 6B (the end part of the member 6), as shown in Fig. 8, contacts with and presses against the sensing part 10A of the nozzle switch 10 attached to the upper panel 102. When the sensing unit 10A is pressed, the nozzle switch 10 generates an OFF signal (a signal indicating that the fueling nozzle 20 is hooked on the nozzle hook 1) in a control device (not shown) of the fueling apparatus 100. As described above, since the notch 6F formed in the driving member 6 (the body 6A) comes into contact with the stopper pin 9 fixed to the mounting bracket 12, it is prevented that an excessive force is applied to the working piece 6C (leaf spring). When the fueling nozzle 20 is unhooked from the nozzle hook 1 (when the state shown in Fig. 8 is changed to the state shown in Fig. 7), rotation of the working piece mounting part 6B of the driving member 6 is limited to an appropriate range by the stopper 14 provided on the mounting bracket 12.

[0030.] Here, regarding the relative position between the leaf spring 6C (working piece) and the sensing part 10A of the nozzle switch 10, even if the fueling nozzle 20 (Fig. 2) is hooked on the nozzle hook 1 as shown in Fig. 9, there is a possibility that the leaf spring 6C attached to the working piece attachment part 6B of the driving member 6 will not come into contact with the sensing part 10A of the nozzle switch 10 (so-called "submerged" state). If the panel is opened and closed with the fueling nozzle 20 hooked on the nozzle hook 1, there is a risk of the state shown

in Fig. 9 (so-called “submerged” state), and in such a state, even though the fueling nozzle 20 is hooked on the nozzle hook 1, the leaf spring 6C is not in contact with the sensing part 10A of the nozzle switch 10, so that the nozzle switch 10 and a control device (not shown) of the fueling apparatus 100 judge that the fueling nozzle 20 is not hooked on the nozzle hook 1. Then, in the state shown in Fig. 9 (“submerged” state), even if the fueling nozzle 20 is subsequently unhooked from the nozzle hook 1 and hooked again, the leaf spring 6C (working piece) does not touch the sensing unit 10A of the nozzle switch 10.

[0031.] According to the research of the inventors, as shown in Fig. 10, it was found that when the fueling nozzle 20 (Fig. 2) was hooked on the nozzle hook 1, the leaf spring C (working piece) contacted the nozzle switch 10 at the position P1 shown by the solid line, however, if the position of the leaf spring 6C (working piece) was set to the position P2 shown by the dotted line when it was assumed that the nozzle switch 10 did not exist, the state shown in Fig. 9 (“submerged” state) could be prevented. More specifically, setting the projection position of the leaf spring 6C in the arrow A81 viewing (the same arrow viewing direction as the arrow A10 in Fig. 10) in Fig. 8 in which the fueling nozzle 20 is hooked on the nozzle hook 1 to coincide with the projection position of the leaf spring 6C in the arrow A71 viewing (the same arrow viewing direction as the arrow A10 in Fig. 10) in Fig. 7 when the fueling nozzle 20 is not hooked on the nozzle hook 1 allows the state shown in Fig. 9 (“submerged” state) not to reach. Here, the directions of the arrows A71 (Fig. 7), the arrows A81 (Fig. 8), and the arrow A10 (Fig. 10) are all directions horizontally seen from the side opposite to the nozzle switch 10 of the upper panel 102 to which the nozzle switch 10 is attached, and the same direction.

[0032.] According to the embodiment of the present invention shown in Figs. 1 to 10, when the fueling nozzle 20 is hooked on the nozzle hook 1, the switch part 4 is pressed in the arrow A1 direction (Figs. 1 and 3) by the lever guard 22 of the fueling nozzle 20, and the switch part 4 rotates counterclockwise around the rotating shaft 4A, and the convex part 4B of the switch part 4 presses the pressing part 5A of the rotating member 5. Then, the pressing part 5A of the rotating member 5 rotates around the first rotating shaft 5B as shown by the arrow A2, and the first connecting part 5C of the substantially L-shaped rotating member 5 rotates in the direction of the arrow A3. As a result, the wire 7A of the connecting member 7 is pulled in the direction of the arrow A4 via the first connecting part 5C, and the tensile force is transmitted to the driving member 6 via the second connecting part 6E. The driving member 6 rotates in the direction of the arrow A5 about the second rotating shaft 6D, and the working piece mounting part 6B of the driving member 6 rotates in the direction of the arrow A6, and the working piece

6C attached to the end of the working piece mounting part 6B contacts with and presses against the sensing part 10A of the nozzle switch 10 attached to the upper panel 102 to drive the nozzle switch 10. When the fueling nozzle 20 is unhooked (unhanged) from the nozzle hook 1, the switch part 4 is pressed in the opposite direction of the arrow A1 (Fig. 3) in Fig. 4, and the pressing part 5A of the rotating member 5 rotates in the opposite direction of A2 (Fig. 3). Then, the part of the rotating member 5 on the first connecting part 5C side rotates in the opposite direction of the arrow A3 (Fig. 3), and the wire 7A of the connecting member 7 moves in the opposite direction of the arrow A4 direction (Fig. 3). Then, in Fig. 7, the driving member 6 rotates in the opposite direction of the arrow A5 (Fig. 7), and the working piece mounting part 6B of the driving member 6 rotates in the reverse direction of the arrow A6 (Fig. 7), and the working piece 6C does not come into contact with the sensing part 10A of the nozzle switch 10. Therefore, the nozzle switch 10 can be reliably operated by hooking and unhooking (hanging and unhanging) the fueling nozzle 20.

[0033.] In the illustrated embodiment, since the rotating member 5 has a pressing part 5A pressed by the convex part 4B formed on the back surface of the switch part 4, and a first rotating shaft 5B that rotates by receiving a force from the pressing part 5A, and a first connecting part 5C for connecting an end 7C of the connecting member 7 at a position separated from the first rotating shaft 5B, the rotation amount of the rotating member 5 can be set according to the distance between the first rotating shaft 5B and the first connecting part 5C. In addition, the displacement amount (movement amount) of the connecting member 7 can be set. In the illustrated embodiment, in Fig. 6, a surface of the part 4B on the pressing part 5A side is formed such that the arc AR2, which is the locus of the first connecting part 5C, is equally divided by the horizontal extension line (virtual radius k) of the first rotating shaft 5B. Therefore, the horizontal deviation amount H in Fig. 6 is minimized, and the rotation of the rotating member 5 is most efficiently converted into the tensile force of the wire 7A of the connecting member 7.

[0034.] Further, in the illustrated embodiment, as shown in Fig. 5, in case that the direction of the force when the convex part 4B of the switch part 4 starts pushing the pressing part 5A of the rotating member 5 is set as the arrow F1, and the direction of the force when the convex part 4B finishes pushing the pressing part 5A is set as the arrow F2, the shape (the shape on the pressing part 5A side) of the convex part 4B is adjusted, and the force F when the switch part 4 of the nozzle hook 1 is pressed is caused to act on the region between the direction of the start of pushing (direction of arrow F1) and the direction of ending of pushing (direction of arrow F2) to approximate the direction in which the force F acts to the direction of the tangent TL of the arc AR1 (circle with radius

L5). Therefore, the force of the convex part 4B of the switch part 4 pressing the pressing part 5A of the rotating member 5 acts in the vicinity of the tangential line TL of the arc AR1, so that the force when the switch part 4 of the nozzle hook 1 is pressed is effectively transmitted as the rotational force of the rotating member 5.

[0035.] Further, in the illustrated embodiment, since the driving member 6 has a second rotating shaft 6D provided with a spring for urging the other end 7D of the connecting member 7 in a pulling direction, and a working piece 6C (leaf spring) for operating a nozzle switch 10 at an end, and the second connecting part 6E for connecting the connecting member 7 at the other end, the operation of the switch part 4 can be reliably transmitted to the nozzle switch 10. Here, the nozzle switch 10 is attached to the upper panel 102 of the housing body 101, and the horizontal arrow projection position, of the working piece 6C (leaf spring) in a state where the fueling nozzle 20 is hooked on the nozzle hook 1, from the side opposite to the nozzle switch 10 of the upper panel 102 to which the nozzle switch 10 is attached, coincides with that of the working piece 6C (leaf spring) in a state where the fueling nozzle 20 is not hooked on the nozzle hook. Therefore, it is possible to prevent the working piece 6C (leaf spring) from coming into contact with the nozzle switch 10 even if the fueling nozzle 20 is hooked on the nozzle hook 1 (see Fig. 9: so-called "submerged" state).

[0036.] Further, in the illustrated embodiment, the driving member 6 is provided with a notch 6F that contacts with the stopper pin 9 fixed to the nozzle hook body 2 side, so that a force is not excessively applied to the working piece 6C, which prevents the nozzle switch 10 from being damaged.

[0037.] Figure 11 shows the first modification of the embodiment shown in Figs. 1 to 10. In the following description of the first modification, the parts different from the embodiment shown in Figs. 1 to 10 will be mainly described. In Fig. 11, the nozzle hook 1-1 of the fueling apparatus 100-1 according to the first modification includes a switch part 4-1, a rotating member 5-1, a driving member 6-1, and a connecting member 7-1 for connecting the rotating member 5-1 and the driving member 6-1. When a fueling nozzle (not shown) is hooked (hanged) on the nozzle hook 1-1, the switch part 4-1 is pressed in the direction of the arrow A11 by a lever guard (not shown) in the fueling nozzle, and rotates about the rotating shaft 4A-1. The rotating member 5-1 is a member that rotates about the rotating shaft 4A-1 when the switch part 4-1 rotates. The driving member 6-1 is driven by the rotating member 5-1 via the connecting member 7-1, and the nozzle switch 10 is turned on and off. The nozzle switch 10 is arranged at a position separated from the nozzle hook body 2-1 and is attached to the upper panel 102 of the housing body 101.

[0038.] In Fig. 11, the switch part 4-1 is rotatably supported by the rotating shaft 4A-1 fixed to a nozzle hook body 2-1 and is urged by the elastic repulsive force of an urging means (not shown) outward from the nozzle hook body 2-1 from the opening 2A-1 of the nozzle hook body 2-1 (urged so as to project to the left in Fig. 11). The rotating member 5-1 is a rectangular plate-shaped member that is rotatably supported, at an end thereof, by a rotating shaft 4A-1, and is configured to rotate at the same rotation center (rotating shaft 4A-1) as the switch part 4-1. A first connecting part 5A-1 is provided at the other end of the rotating member 5-1 and the rotating member 5-1 is connected to the connecting member 7-1 at the first connecting part 5A-1. The connecting member 7-1 includes a wire 7A-1 and a sheath 7B-1 (cover member), and an end 7C-1 of the connecting member 7-1 is connected to the first connecting part 5A-1 of the rotating member 5-1. The other end 7D-1 of the connecting member 7-1 is connected to the second connecting part 6E-1 of the driving member 6-1.

[0039.] The driving member 6-1 has a body part 6A-1 which is a rectangular plate-shaped member, a working piece mounting part 6B-1, and a working piece 6C-1 (leaf spring). The working piece mounting part 6B-1 is connected to an end part of the body part 6A-1 (the end part on the side separated from the connecting member 7-1). The working piece 6C-1 is fixed to the tip of the working piece mounting part 6B-1 and has a function of operating the nozzle switch 10. The body part 6A-1 of the driving member 6-1 is rotatably supported with the mounting bracket 12 through the second rotating shaft 6D-1. The mounting bracket 12 is fixed to the upper part of the nozzle hook body 2-1. The second rotating shaft 6D-1 is provided with a spring at the other end 7D-1 of the connecting member 7-1, and the spring urges the other end 7D-1 so as to pull the other end 7D-1 in the opposite direction of the arrow A51 (urges to maintain the state shown in Fig. 11).

[0040.] In Fig. 11, when a fueling nozzle (not shown) is hooked on the nozzle hook 1-1, the switch part 4-1 is pressed in the direction of the arrow A11, and the switch part 4-1 rotates counterclockwise around the rotating part 4A-1. When the switch part 4-1 rotates counterclockwise around the rotating part 4A-1, the rotating member 5-1 rotates around the rotating part 4A-1 in the direction of the arrow A21. Then, the first connecting part 5A-1 of the rotating member 5-1 also rotates in the direction of the arrow A21. When the first connecting part 5A-1 rotates in the direction of the arrow A21, the wire 7A-1 of the connecting member 7-1 connected to the first connecting part 5A-1 is pulled in the direction of the arrow A41. When the wire 7A-1 is pulled in the direction of the arrow A41, the driving member 6-1 connected to the wire 7A-1 at the second connecting part 6E-1 rotates in the direction of the arrow A51 around the second rotating shaft 6D-1. When the driving

member 6-1 rotates in the direction of the arrow A51 about the second rotating shaft 6D-1, the working piece mounting part 6B-1 side of the driving member 6-1 rotates in the direction of the arrow A61, and the working piece 6C-1 attached to an end of the working piece mounting part 6B-1 also rotates in the A61 direction and comes into contact with the sensing part 10A of the nozzle switch 10 attached to the upper panel 102. As a result, the nozzle switch 10 generates an OFF signal (the signal indicating that the fueling nozzle is hooked on the nozzle hook 1-1) in a control device (not shown) of the fueling apparatus 100-1.

[0041.] On the other hand, when a fueling nozzle (not shown) is unhooked (unchanged) from the nozzle hook 1-1, the switch part 4-1 moves in the opposite direction of the arrow A11, and the rotating member 5-1 rotates in the opposite direction of the arrow A21. Then, the wire 7A-1 of the connecting member 7-1 connected to the first connecting part 5A-1 is pressed in the opposite direction of the arrow A41, and the driving member 6-1 rotates in the opposite direction of the arrow A51. As a result, the working piece mounting part 6B-1 side of the driving member 6-1 rotates in the opposite direction of the arrow A61, and the working piece 6C-1 also rotates in the opposite direction of the A61, and separates from the sensing part 10A of the nozzle switch 10, and the nozzle switch 10 generates an ON signal (the signal indicating that the fueling nozzle is unhooked from the nozzle hook 1-1) in a control device (not shown) of the fueling apparatus 100-1.

[0042.] In the nozzle hook 1-1 of the first modification of Fig. 11, the shape and arrangement of the rotating member 5-1 and the arrangement of the driving member 6-1 are different from those of the embodiment of Figs. 1 to 10, so that the layout of the connecting member 7 is significantly different. In the first modification of Fig. 11 also, as in the embodiment of Figs. 1 to 10, forming a notch in the driving member 6-1 (body part 6A-1), fixing a stopper pin to the mounting bracket 12 and contacting the notch with the stopper pin prevent an excessive force from being applied to the working piece 6C. Further, in the rotating part 4A-1 shared by the switch part 4-1 and the rotating member 5-1, it is also possible to set the rotation angle of the switch part 4-1 and that of the rotating member 5-1 around the rotating part 4A-1 to be different from each other. Other configurations and operational effects in the first modification of Fig. 11 are the same as those of the embodiment shown in Figs. 1 to 10.

[0043.] Figure 12 shows the second modification of the embodiment of Figs. 1 to 10. In the second modification also, the parts different from the embodiment shown in Figs. 1 to 10 will be mainly described. In Fig. 12, a fueling nozzle is not hooked on a nozzle hook 1-2 of a fueling apparatus 100-2. The nozzle hook 1-2 includes a switch part 4-2, a rotating member 5-2, a driving member 6-2, and a connecting member 7-

2. In Fig. 12, when a fueling nozzle (not shown) is hooked (hanged) on the nozzle hook 1-2, the switch part 4-2 is pressed in the direction of the arrow A21 by a lever guard (not shown), and rotates around a rotating shaft 4A-2. When the switch part 4-2 rotates around the rotating shaft 4A-2, the rotating member 5-2 also rotates around the rotating shaft 4A-2. The driving member 6-2 is driven by the rotating member 5-2 and is arranged at a position separated from the nozzle hook body 2-2, and has a function of driving the nozzle switch 10 attached to the upper panel 102 of the housing body 101. The connecting member 7-2 connects the rotating member 5-2 and the driving member 6-2.

[0044.] In Fig. 12, the switch part 4-2 is rotatably supported by a rotating shaft 4A-2 fixed to the nozzle hook body 2-2, and is urged by a repulsive force of urging means (not shown) such as a spring so as to protrude outward (to the left in Fig. 12) of the nozzle hanging body 2-2 from the opening 2A-2 of the nozzle hanging body 2-2. The rotating shaft 4A-2 of the rotation member 5-2, which is a rectangular plate-shaped member, is also the rotating shaft 4A-2 of the switch part 4-2, and the both rotate concentrically. The rotating member 5-2 is rotatably supported, at an end thereof, by the rotating shaft 4A-2. A first connecting part 5A-2 is provided at the other end of the rotating member 5-2, and the rotating member 5-2 is connected to the connecting member 7-2 at the first connecting part 5A-2. The connecting member 7-2 includes a wire 7A-2 and a sheath 7B-2 (cover member), and an end 7C-2 of the connecting member 7-2 is attached to the first connecting part 5A-2 of the rotating member 5-2. The other end 7D-2 of the connecting member 7-2 is connected to the second connecting part 6E-2 of the driving member 6-2.

[0045.] The driving member 6-2 has a body part 6A-2 which is a rectangular plate-shaped member, a working piece mounting part 6B-2 connected to an end part of the body part 6A-2 (the end part on the side separated from the connecting member 7-2), and a working piece 6C-2 (leaf spring). The working piece 6C-2 is fixed to the tip of the working piece mounting part 6B-2 and has a function of operating the nozzle switch 10. The driving member 6-2 is rotatably supported on the mounting bracket 12 through the second rotating shaft 6D-2 in the body part 6A-2. The mounting bracket 12 is fixed to the upper part of the nozzle hook body 2-2. The second rotating shaft 6D-2 is provided with a spring that urges the other end 7D-2 of the connecting member 7-2 so as to pull in the direction opposite to the arrow A52, and is urged to maintain the state of Fig. 12 through the elastic repulsive force of the spring. Further, a notch 6F-2 is formed in the body 6A-2 of the driving member 6-2, the stopper pin 9 is located in the notch 6F-2, and the stopper pin 9 is fixed to the mounting bracket 12. Contacting the notch 6F-2 with the stopper pin 9 prevents an excessive force from acting on

the leaf spring 6C-2 when a fueling nozzle is hooked on the nozzle hook 1-2.

[0046.] In Fig. 12, when a fueling nozzle (not shown) is hooked on the nozzle hook 1-2, the switch part 4-2 is pressed in the direction of the arrow A21 and rotates clockwise around the rotating part 4A-2. When the switch part 4-2 rotates clockwise around the rotating part 4A-2, the rotating member 5-2 rotates in the direction of the arrow A22 around the rotating part 4A-2, and the rotating member 5-2 rotates in the direction of arrow A22 around the rotating part 4A-2, and the first connecting part 5A-2 of the rotating member 5-2 rotates in the direction of arrow A22. When the first connecting part 5A-2 rotates in the direction of the arrow A22, the wire 7A-2 of the connecting member 7-2 connected to the rotating member 5-2 at the first connecting part 5A-2 is pulled in the direction of the arrow A42. When the wire 7A-2 is pulled in the direction of the arrow A42, the driving member 6-2 connected to the wire 7A-2 of the connecting member 7-2 at the second connecting part 6E-2 rotates in the direction of arrow A52 around the second rotating shaft 6D-2. When the driving member 6-2 rotates in the direction of arrow A52 about the second rotating shaft 6D-2, the working piece mounting part 6B-2 side of the driving member 6-2 rotates in the direction of the arrow A62, and the working piece 6C-2 attached to an end of the attachment part 6B-2, as shown in Fig. 12, comes into contact with the sensing part 10A of the nozzle switch 10 attached to the upper panel 102. Then, the nozzle switch 10 generates an OFF signal (the signal indicating that the fueling nozzle is hooked on the nozzle hook 1-2) in a control device (not shown) of the fueling apparatus 100-2.

[0047.] On the other hand, when a fueling nozzle (not shown) is unhooked (unchanged) from the nozzle hook 1-2, the switch part 4-2 moves in the opposite direction of the arrow A21, and the rotating member 5-2 and the first connecting part 5A-2 rotate in the opposite direction of the arrow A22, and the wire 7A-2 of the connecting member 7-2 is pressed in the opposite direction of the arrow A42. Then, the driving member 6-2 rotates in the opposite direction of the arrow A52, and the working piece mounting part 6B-2 side of the driving member 6-2 rotates in the opposite direction of the arrow A62. Therefore, the working piece 6C-2 is separated from the sensing part 10A of the nozzle switch 10. The nozzle switch 10 generates an ON signal (the signal indicating that the fueling nozzle is unhooked from the nozzle hook 1-2) to a control device (not shown) of the fueling apparatus 100-2.

[0048.] In the nozzle hook 1-2 of the second modification of Fig. 12 also, the shape and arrangement of the rotating member 5-2 are different from those of the embodiment of Figs. 1 to 10. In the second modification of Fig. 12, in the rotating part 4A-2 shared by the switch part 4-2 and the rotating member 5-2, it is also possible to set the rotation angle of the

switch part 4-2 and that of the rotating member 5-2 centered on the rotating part 4A-2 are different from each other. Other configurations and operational effects in the second modification of Fig. 12 are the same as those of the embodiment of Figs. 1 to 11.

[0049.] It is added that the illustrated embodiments are merely examples and are not a description intended to limit the technical scope of the present invention.

DESCRIPTION OF THE REFERENCE NUMERALS

[0050.]

- 1, 1-1, 1-2 nozzle hook
- 2 nozzle hook body
- 3 receiving part
- 4 switch part
- 4A rotating part
- 4B convex part
- 5 rotating member
- 5A pressing part
- 5B first rotating shaft
- 5C first connecting part
- 6 driving member
- 6A body part
- 6B working piece mounting part
- 6C working piece
- 6D second rotating shaft
- 6E second connecting part
- 6F notch
- 7 connecting member
- 7C an end of the connecting member
- 7D the other end of the connecting member
- 9 stopper pin
- 10 nozzle switch
- 20 fueling nozzle
- 21 discharge pipe
- 22 lever guard
- 101 housing body
- 102 upper panel

CLAIMS

[Claim 1] A nozzle hook of fueling apparatus comprising:

a nozzle hook body for holding a discharge pipe of a fueling nozzle;

a receiving part for holding a lever guard of the fueling nozzle;

a switch part operated by the lever guard;

a rotating member, when the fueling nozzle is hooked on the nozzle hook, said rotating member is pressed by the lever guard and a back surface of the switch part comes into contact with said rotating member;

a driving member driven by the rotating member, said driving member disposed at a position away from the nozzle hook body, and said driving member driving a nozzle switch attached to a housing body; and

a connecting member for connecting the rotating member and the driving member.

[Claim 2] The nozzle hook of fueling apparatus as claimed in claim 1, wherein said rotating member comprising:

a pressing part pressed by a convex part formed on the back surface of the switch part;

a first rotating shaft rotating by receiving a force from the pressing part; and

a first connecting part for connecting an end of the connecting member at a position separated from the first rotating shaft.

[Claim 3] The nozzle hook of fueling apparatus as claimed in claim 2, wherein said pressing part is cylindrical.

[Claim 4] The nozzle hook of fueling apparatus as claimed in claim 2 or 3, wherein a surface of said convex part on the pressing part side is formed such that an arc that is a locus of the first connecting part is equally divided by a horizontal extension line of the first rotating shaft.

[Claim 5] The nozzle hook of fueling apparatus as claimed in one of claims 1 to 4, wherein said driving member comprising:

a second rotating shaft with a spring for urging another end of the connecting member in a pulling direction;

a working piece provided at an end to operate the nozzle switch; and

a second connecting part provided at another end to connect the connecting member.

[Claim 6] The nozzle hook of fueling apparatus as claimed in claim 5, wherein said nozzle switch is attached to an upper panel of the housing body, and a horizontal projection position of the working piece from an opposite side of the nozzle switch on the upper panel to which the nozzle switch is attached when the fueling nozzle is hooked on the nozzle hook and that of the working piece when the fueling nozzle is not hooked on the nozzle hook are the same.

[Claim 7] The nozzle hook of fueling apparatus as claimed in one of claims 1 to 6, wherein said driving member is provided with a notch that contacts with a stopper pin.